In This Section

- River Basin Description
- Population and Land Use
- Local Governments and Planning Authorities
- Water Use Classifications

River Basin Characteristics

This section describes the following major characteristics of the Ocmulgee River basin:

- *River basin description (Section 2.1): the physical features and natural processes of the basin.*
- *Population and land use (Section 2.2): the sociological features of the basin, including the types of human activities that might affect water quality and water resource use.*
- *Local governments and planning authorities (Section 2.3): identification and roles of the local authorities within the basin.*
- *Water use classifications (Section 2.4): description of water use classifications and baseline goals for management of waters within the basin as defined in the state regulatory framework.*

2.1 River Basin Description

This section describes the important geographical, geological, hydrological, and biological characteristics of the Ocmulgee River basin.

The physical characteristics of the Ocmulgee River basin include its location, physiography, soils, climate, surface water and groundwater resources, and natural water quality. These physical characteristics influence the basin's biological habitats and the ways people use the basin's land and water resources.

2.1.1 River Basin Boundaries

The Ocmulgee River basin is located in the Piedmont and Coastal Plain physiographic provinces of central Georgia. The Ocmulgee basin is flanked by the Flint River basin to the west, the Suwannee and Satilla River basins to the south, and the Oconee River basin to the east (Figure 2-1). The headwaters of the basin are located in DeKalb and Gwinnett Counties and consist of the Alcovy, Yellow, and South Rivers that drain the eastern and southeastern Metropolitan Atlanta area. These rivers, which join at Jackson Lake west of Monticello, Georgia, form the present-day Ocmulgee River. The Ocmulgee River continues in a generally southerly direction until it swings eastward north of Ben Hill

County, converges with the Little Ocmulgee River at Lumber City in Telfair County, and about eight miles farther downstream joins the Oconee River to form the Altamaha River. South of Jackson Lake, the Towaliga River and several large creeks including Tobesofkee, Echeconnee, and Big Indian Creeks join the Ocmulgee River. The Ocmulgee River basin is located entirely in the State of Georgia and drains approximately 6,085 square miles.

The U.S. Geological Survey (USGS) has divided the Ocmulgee River basin into three subbasins, or Hydrologic Unit Codes (HUCs; see Table 2-1). These HUCs are referred to repeatedly in this report to distinguish conditions in different parts of the Ocmulgee River basin. Figure 2-2 shows the location of these subbasins and the associated counties within each subbasin.

Table 2-I. Hydrologic Unit Codes (HUCs) of the Ocmulgee River Basin in Georgia

03070103	Upper Ocmulgee River Subbasin
03070104	Lower Ocmulgee River Subbasin
03070105	Little Ocmulgee River Subbasin

2.1.2 Climate

Mild winters and hot summers characterize the Ocmulgee River basin. Mean annual precipitation ranges from 40 to 52 inches per year. Precipitation occurs chiefly as rainfall, and to a much lesser extent in the upper portion of the basin, as occasional snowfall. Rainfall is fairly evenly distributed throughout the year, but a distinct dry season occurs from mid-summer to late fall. Rainfall is usually greatest in March and least in October. The mean annual temperature is about 60 degrees Fahrenheit (Journey and Atkins, 1996; citing Peck et al., 1992; Schneider et al., 1965; and Carter and Stiles, 1983).

2.1.3 Physiography, Geology, and Soils

Physiography

The Ocmulgee River basin occupies parts of the Piedmont and Coastal Plain physiographic provinces, which extend throughout most of the southeastern United States. Similar to much of the Southeast, the basin's physiography reflects a geologic history of mountain building in the Appalachian Mountains and long periods of repeated land submergence and emergence in the Coastal Plain province. Glaciers, which influenced the physiography of much of North America, never extended to the southeastern United States, but climatic effects associated with Pleistocene continental glaciation probably influenced regional ecological settings and erosion rates. The northernmost part of the Ocmulgee River basin is within the Piedmont Province where the headwaters arise. The Piedmont province is underlain by local Precambrian and abundant Paleozoic crystalline rocks that include metamorphosed sedimentary and volcanic rocks (e.g., mica schist, felsic and mafic gneiss and schist, quartzite and marble), metamorphosed igneous rocks such as granite gneiss and metagabbro and post-tectonic igneous plutons of granitic composition. Mesozoic diabase dikes that crosscut the older crystalline Piedmont rocks are the youngest crystalline component of the province. The Piedmont contains numerous inactive fault zones and joint patterns within the rocks. These structures locally dictate the surface stream patterns and groundwater resources. The crystalline rocks typically are overlain by a generally porous, residual material known as saprolite. Saprolite is produced by the *in situ* chemical weathering of bedrock.

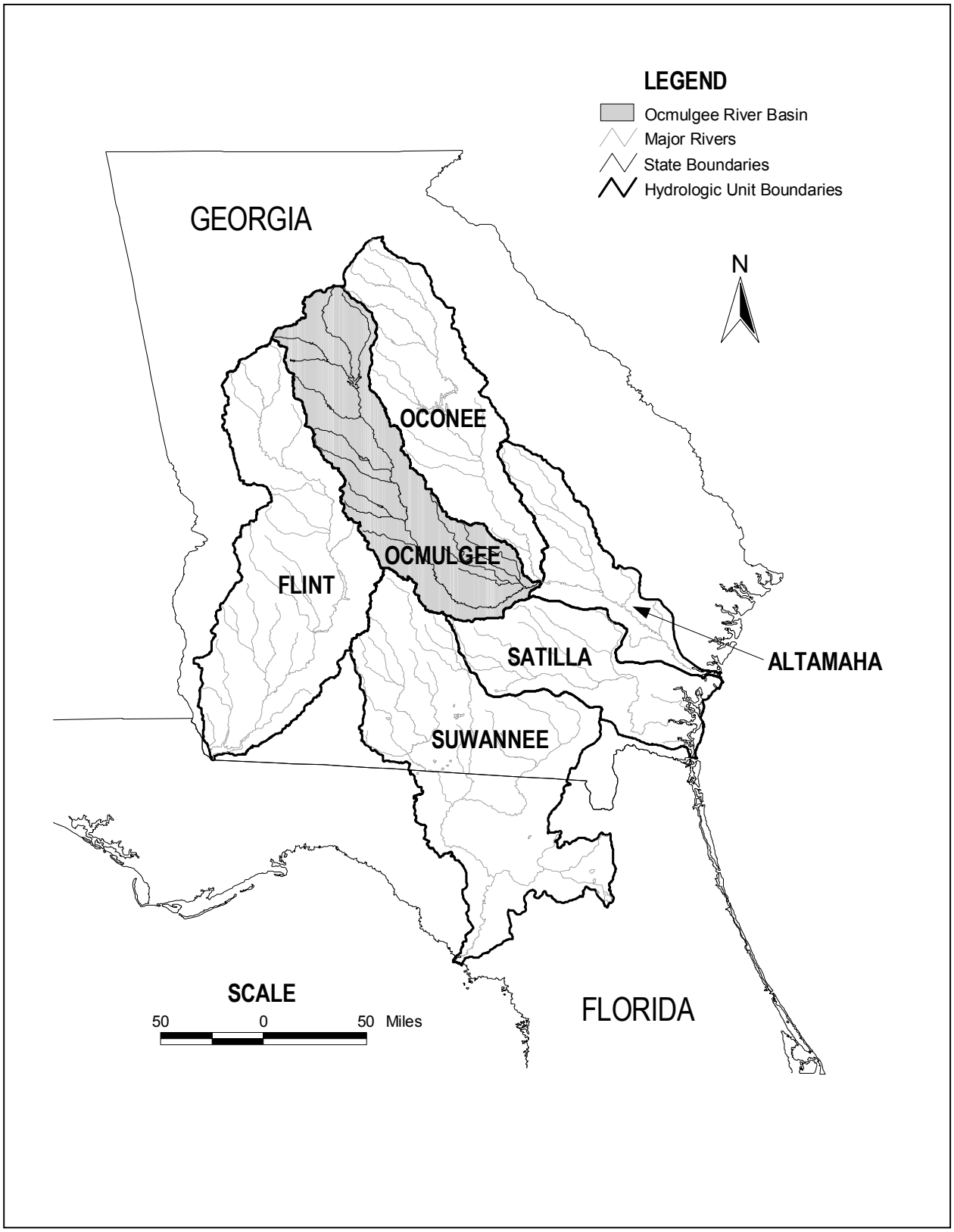

Figure 2-I. Location of the Ocmulgee River Basin

Saprolite retains the original texture of the parent rock although many of the constituent minerals (e.g., feldspars and amphiboles) are altered to clays thus destroying the original integrity of the rock.

The Fall Line unconformity is the boundary between the Piedmont and Coastal Plain provinces. This boundary is the contact between older crystalline metamorphic and igneous rocks of the Piedmont Province and the younger unconsolidated Cretaceous and Tertiary sediments of the Coastal Plain Province. As implied by the name, streams flowing across the Fall Line can undergo abrupt changes in gradient, which are marked by the presence of falls, rapids, and shoals. Geomorphic characteristics of streams differ between the Piedmont and Coastal Plain provinces. Coastal Plain streams typically lack the riffles and shoals common to Piedmont streams, and they exhibit greater floodplain development and increased sinuosity.

Geology

The northernmost part of the basin is within the Piedmont Province. This province constitutes almost 49 percent of the Ocmulgee River basin and is underlain by crystalline metamorphic and igneous rocks. The metamorphic rocks originally were sedimentary, volcanic, and plutonic igneous rocks that have been altered by several stages of regional metamorphism as well as several episodes of granite intrusion. A large portion of the exposed rocks of the Ocmulgee River basin consists of several types of gneisses and granites. The gneisses include several varieties of biotite gneiss, felsic gneiss, granite gneiss, and amphibolite gneiss. Granites include medium-grained to coarse, porphyritic varieties. Other rock types found in the basin include metasedimentary schists and phyllites.

Coastal Plain sedimentary strata underlie approximately 51 percent of the Ocmulgee River basin. Approximately 80 percent of the Coastal Plain sediments in the basin are sands and clays derived from Upper Cretaceous to Miocene strata. The rest include calcareous sediments and Quaternary alluvium. Coastal Plain sediments overlap the igneous and metamorphic rocks of the southern edge of the Piedmont Province at the Fall Line. Coastal Plain sediments nearest to the Fall Line are Cretaceous to Eocene in age. These sediments are dominantly terrestrial to shallow marine in origin and consist of sand, kaolinitic sand, kaolin, and pebbly sand. They host the major kaolin deposits in Georgia, and some of these deposits are found within the Ocmulgee River basin.

Much of the southeastern Piedmont is covered by chemically weathered bedrock called saprolite. Saprolite retains the original texture of the parent rock although many of the constituent minerals (e.g., feldspars and amphiboles) are altered to clays thus destroying the original integrity of the rock. Average saprolite thickness in the Piedmont rarely exceeds 20 meters, but the thickness can vary widely within a short distance. A considerable amount of groundwater flows through the saprolite and recharges streams in the Piedmont. Saprolite is easily eroded when covering vegetation and soil are removed. Predominant soil types in the Piedmont are sandy loam clay to fine sandy loam. South of the Fall Line, soils are loamy sand, sandy loam, and sand. Sandy loam and clay to sand soils cover the rest of the Coastal Plain sediments within the Ocmulgee River basin. Extensive erosion of soil and saprolite caused by agricultural practices during the 1800s and early 1900s contributed a vast quantity of sediment into stream valleys, choking the streams and raising the streams base level. As conservation practices stabilized erosion, streams began to reestablish grade and cut into the thick accumulations of sediments, remobilizing them into the major rivers and eventually redepositing them into man-made reservoirs.

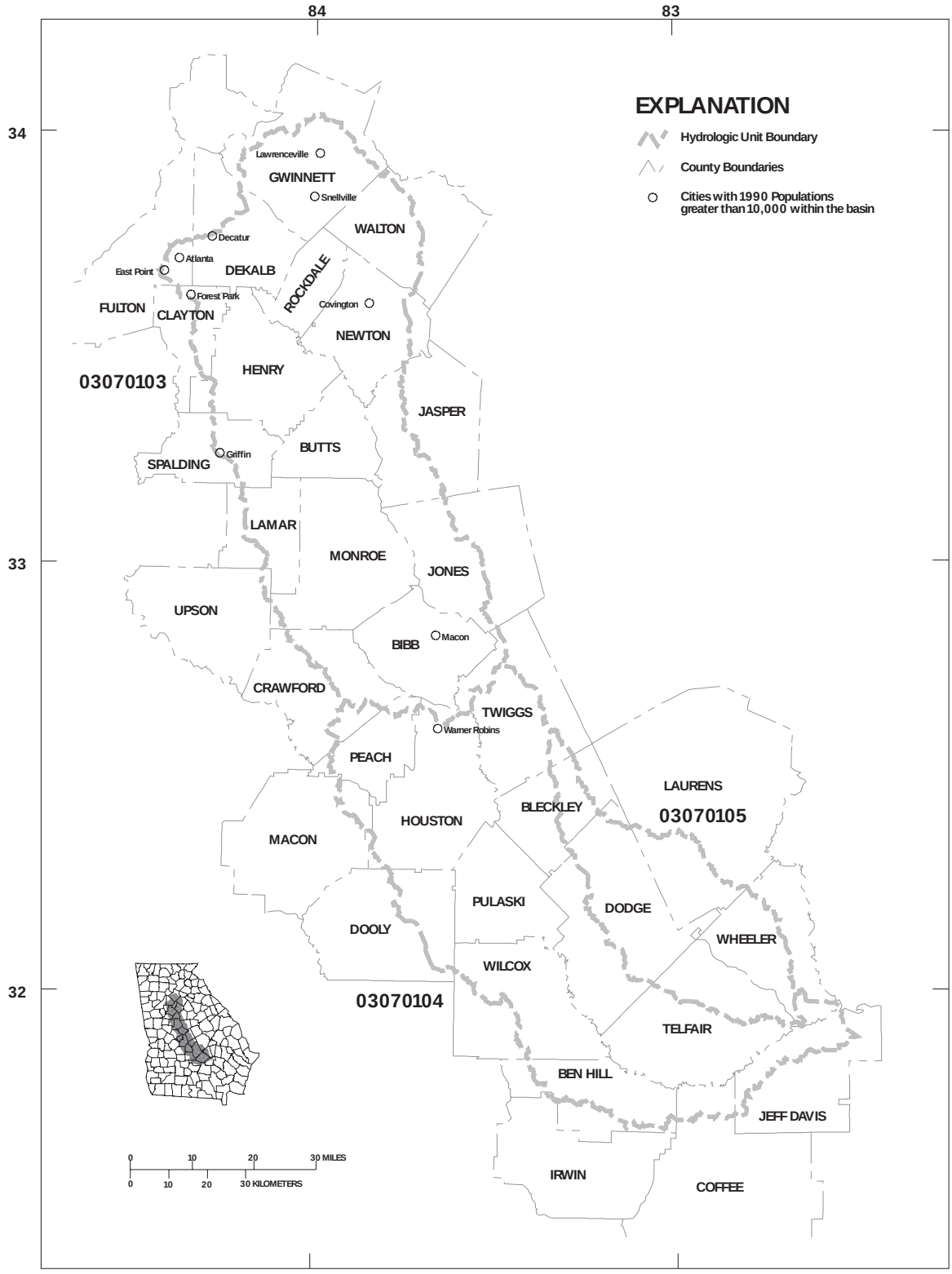

Figure 2-2. Hydrologic Units and Counties of the Ocmulgee River Basin

Soils

The Ocmulgee River watershed crosses four Major Land Resource Areas (MLRAs) (Figure 2-3). Soils vary widely within the watershed, and even within each of the MLRAs in the watershed. Some general trends in landscapes and soil properties can be recognized as the watershed is traversed from northwest to southeast: (1) clay content of the soils decreases, (2) sand content increases, (3) slope gradient decreases, (4) depth to water table decreases (soils become wetter), and (5) flood plains become more prominent.

About 50 percent of the watershed is in the Southern Piedmont MLRA. Most of the soils in this region are very deep, well-drained, red, clayey soils that formed from felsic, high grade metamorphic or igneous parent materials. They are generally acidic, and the kaolinitic clays have low activity, which includes low cation exchange capacity (CEC) and low shrink-swell properties. Two groups of soils within this section of the watershed contrast with the dominant soils as just described. Near the northernmost part of the watershed is an area characterized by soils that are coarser in texture and shallower to bedrock than is typical for the Piedmont. Another group of contrasting soils is mostly in the southern end of the Piedmont region of the watershed, but smaller areas are also in the northwest area. These soils developed from mafic parent materials and consequently, are less acid and have higher activity clays than is typical for the Piedmont.

About 5 percent of the watershed is in the Carolina and Georgia Sand Hills MLRA. Soils in this area formed primarily in sandy and loamy marine sediments, which occasionally overly residual Piedmont materials. There are two major groups of soils in this area. One group consists of deep sands ranging from 40 to more than 80 inches deep. The other group consists primarily of soils that have sandy surface and subsurface layers and a loamy subsoil, often exhibiting dense and brittle properties. The dominant soils in this part of the watershed have 40 to 60 inches of sandy materials overlying a loamy subsoil.

About 45 percent of the watershed is in the Southern Coastal Plain MLRA. Soils in this part of the watershed are generally more variable than in other parts, particularly with regards to sand and clay content and wetness. The northern section of the Coastal Plain is characterized by mostly red, well-drained soils that have a sandy surface layer and a loamy or clayey subsoil. Water tables are not evident in most soils, except in depressions and along flood plains. The southern part of the Coastal Plain is more variable. Upland areas are dominated by yellow and brown, well-drained soils that have sandy surface and subsurface layers and a loamy subsoil. Many of these soils have a perched water table at various depths during wet seasons. There are areas of wetter soils scattered throughout this area. A significant area of sandier soils occurs near the Ocmulgee River, especially along the eastern side of the flood plain.

Contained within the Southern Coastal Plain MLRA section of the Ocmulgee River watershed is a small MLRA called Black Lands. This area comprises less than 1 percent of the watershed. This area contains irregular outcroppings of marl deposits. Associated soils usually consist of acid clays overlying the calcareous marl. These soils generally have higher clay content and more active clays than is typical for the region.

2.1.4 Surface Water Resources

The major surface water resources of the Ocmulgee River basin are three major rivers and several large creeks that drain portions of the basin. The northern portion of the basin contains the Alcovy, Yellow, and South Rivers that form the headwaters for the Ocmulgee River basin. The confluence of these streams occurs at Jackson Lake west of Monticello, Georgia. About 13 miles below the confluence, the Towaliga River joins the Ocmulgee River. The southern portion of the basin includes the Little Ocmulgee River

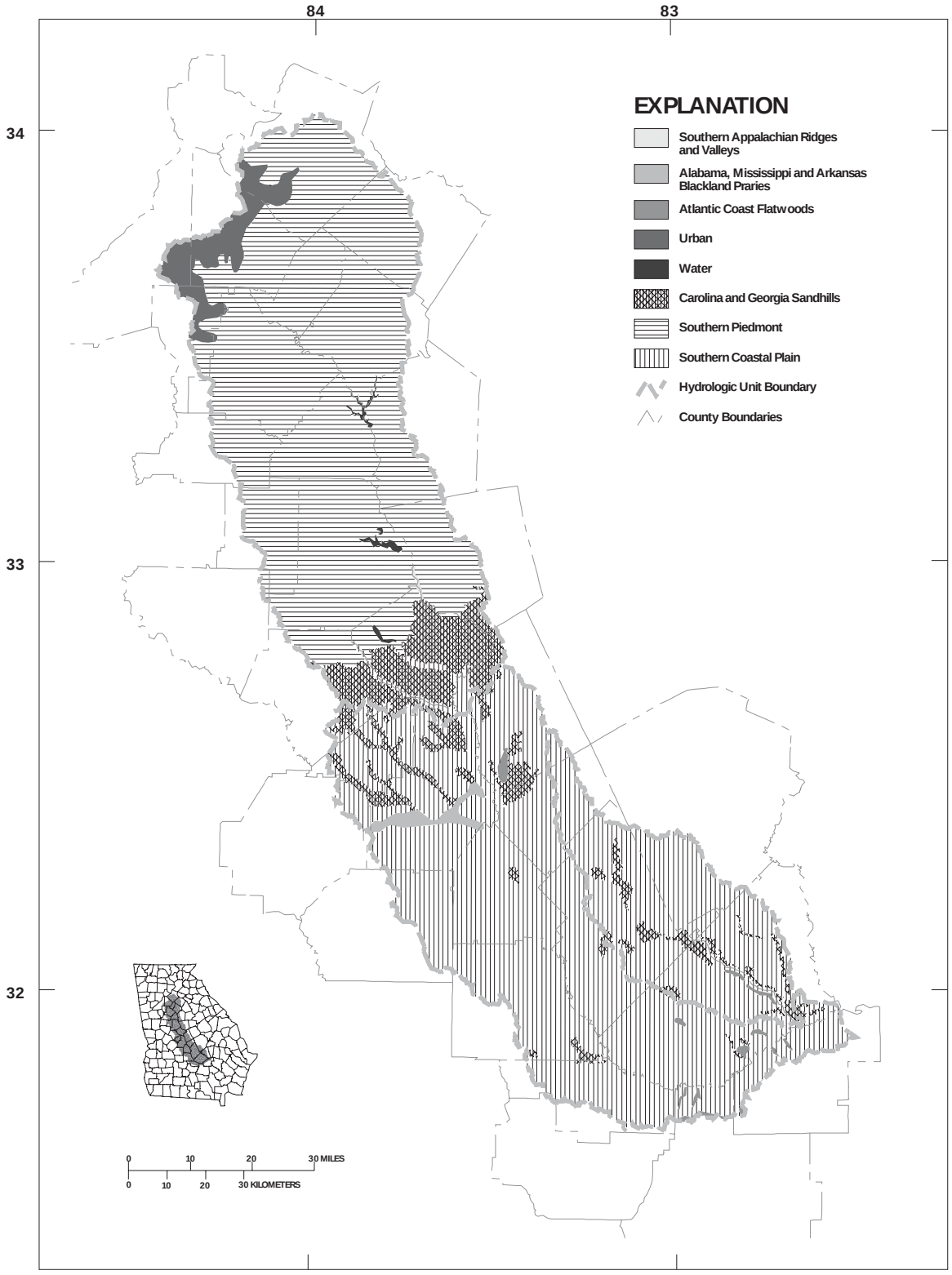

Figure 2-3. Major Land Resource Areas in the Ocmulgee River Basin

drainage area. The Little Ocmulgee and the Ocmulgee Rivers merge about 8 miles upstream of the Ocmulgee-Oconee River confluence at the western end of the Altamaha River basin. Stream networks within each HUC are shown in Figures 2-4 through 2-6.

2.1.5 Groundwater Resources

The Ocmulgee River basin contains a dynamic hydrological system that includes interactions between aquifers, streams, reservoirs, floodplains, and estuaries. Many principal rivers receive a substantial contribution of water from groundwater baseflow during dry periods. Three major aquifer systems, including the Piedmont crystalline rock aquifer and two Coastal Plain aquifers, underlie the Ocmulgee River basin. These aquifers are described below. The Coastal Plain aquifers are generally separated by confining units, and the Piedmont aquifer is typically unconfined.

Piedmont Province – Crystalline Rock Aquifer

The Piedmont province section of the Ocmulgee River basin is underlain by bedrock consisting primarily of granite, gneiss, schist, and quartzite. These rock formations make up the crystalline rock aquifer, which is generally unconfined. Igneous and metamorphic rocks are generally less permeable than coarse-grained or calcareous sedimentary rocks such as weakly cemented sandstone and limestone, respectively. Thus, where groundwater is present, it is stored in rock fractures and a mantle of soil and saprolite (i.e., chemically decomposed rock) and transmitted to wells via fractures, faults, foliations, or other geologic discontinuities (such as compositional layering) in the bedrock. Well yields in this aquifer tend to be unpredictable and highly variable. Typical well yields are 1 to 25 gallons per minute, though systematic well-siting techniques can produce high-yielding wells (greater than 100 gallons per minute). Currently, the crystalline rock aquifer is used primarily for domestic water supply and livestock watering. It is commonly believed that groundwater in the Piedmont part of Georgia is not sufficient to supply such uses as municipal supplies and industry, although several municipalities and industries use groundwater to augment local surface-water resources.

Because groundwater is transmitted through faults and fractures, each surface water drainage basin or watershed is also a groundwater drainage basin or watershed; surface and groundwater are in such close hydraulic interconnection that they can be considered as a single and inseparable system. In the Piedmont, the saprolite that holds groundwater may also contain considerable clay and may act locally as a barrier to groundwater pollution. The Piedmont section of the Ocmulgee River basin is generally ranked as having below-average pollution susceptibility.

The Coastal Plain portion of the Ocmulgee River basin contains two distinct aquifer systems, which are described below.

Coastal Plain Province – Cretaceous Aquifer System

The Cretaceous aquifer system is the deepest of the principal aquifers in South Georgia. Cretaceous units crop out immediately below the Fall Line. The principal water-bearing formation is the Providence Sand of Late Cretaceous Age. Older Cretaceous strata generally are too deep to be economically developed (Couch et al., 1995). The Cretaceous aquifer system serves as a major source of water in the northern third of the Coastal Plain. The aquifer system consists of sand and gravel that locally contains layers

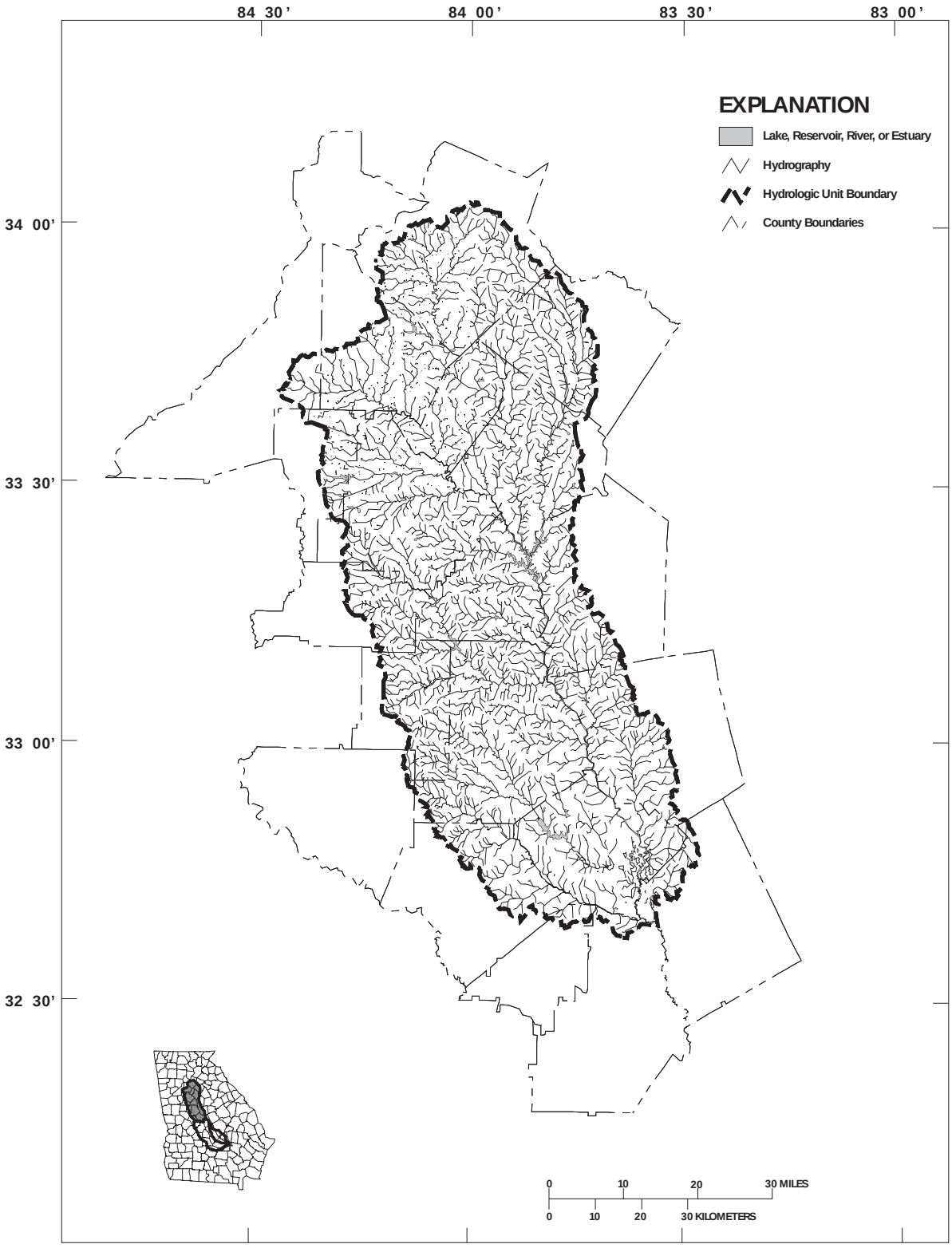

Figure 2-4. Hydrography, Ocmulgee River Basin, HUC 03070103

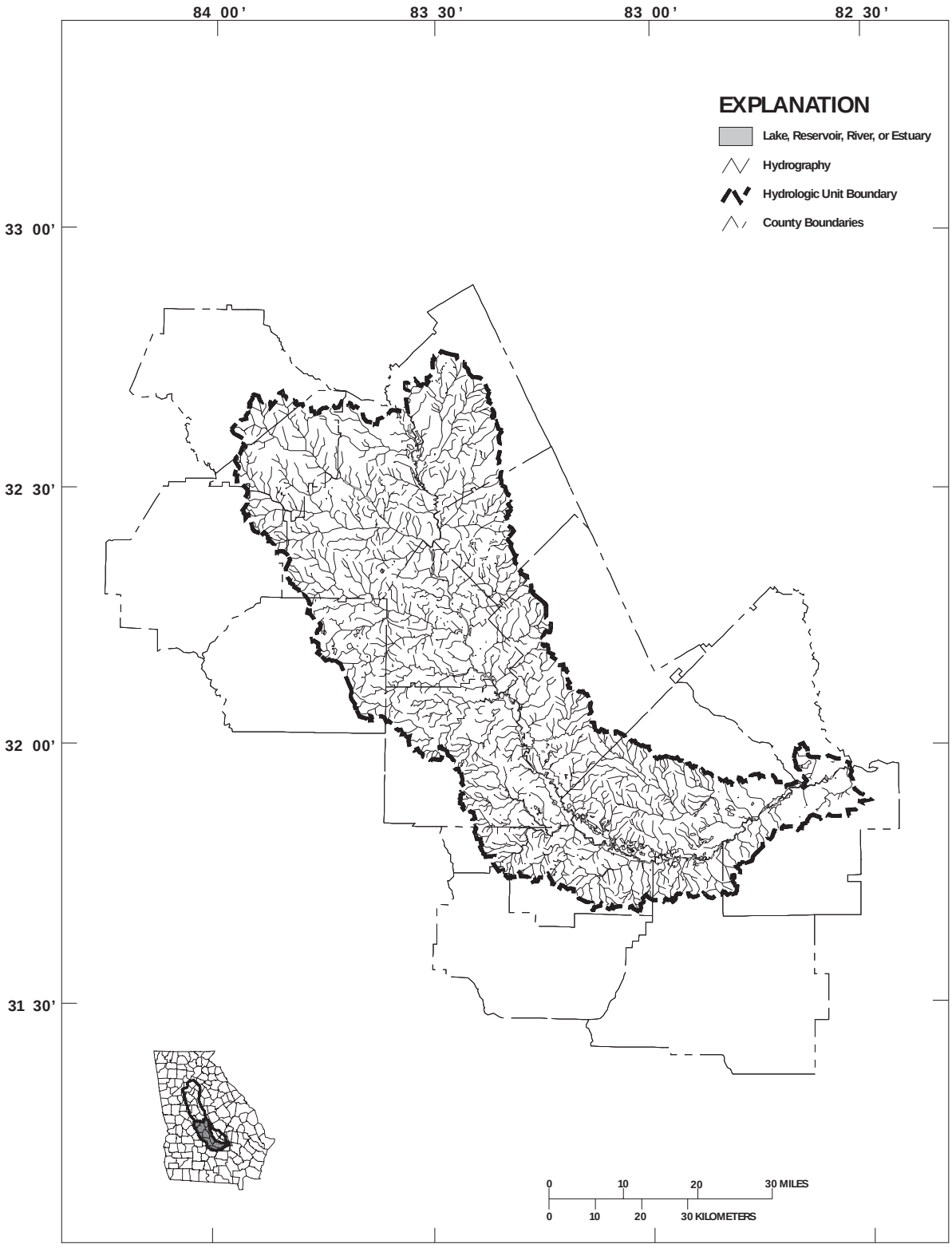

Figure 2-5. Hydrography, Ocmulgee River Basin, HUC 03070104

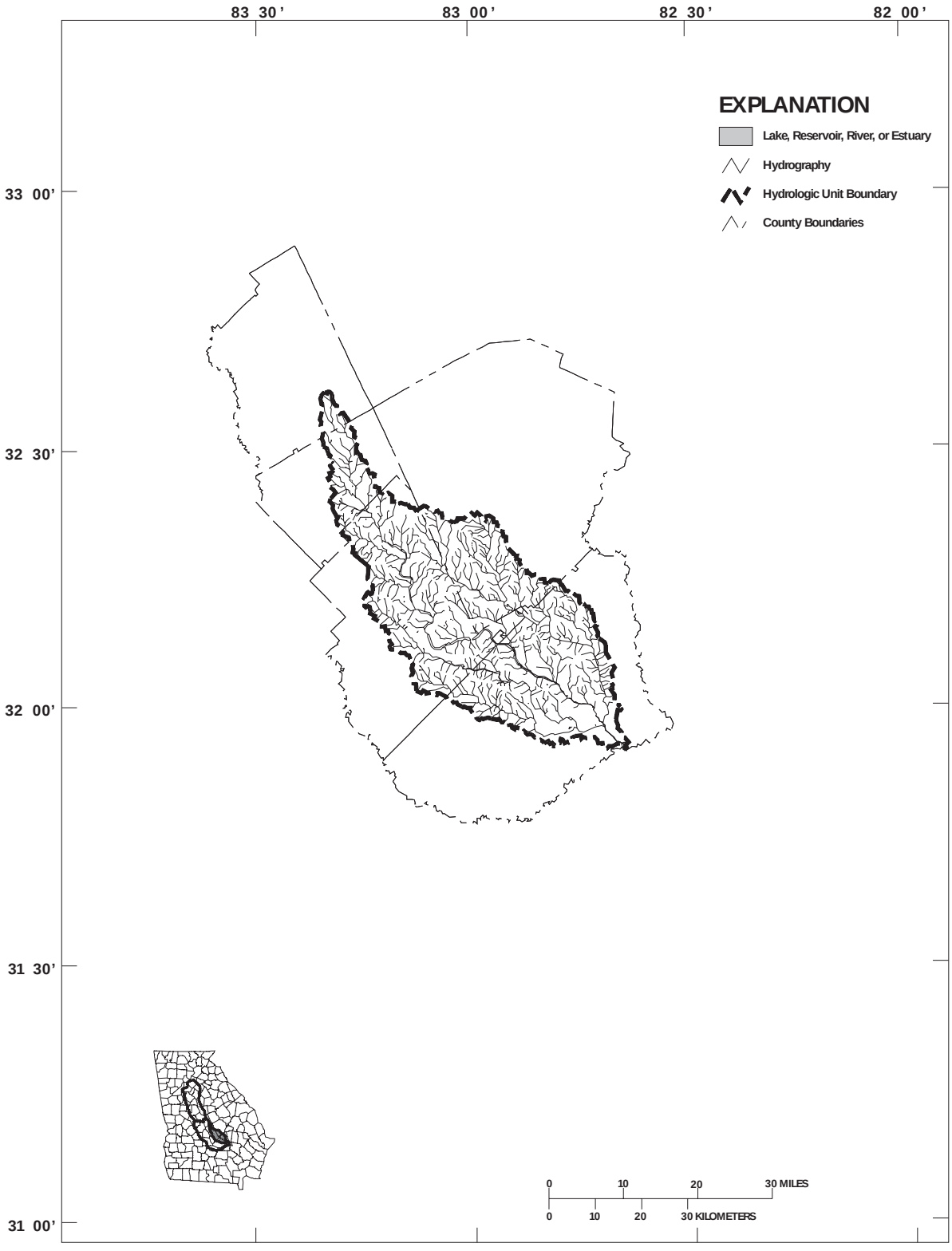

Figure 2-6. Hydrography, Ocmulgee River Basin, HUC 03070105

of clay and silt that function as confining beds. Wells in this aquifer typically yield between 50 and 1,200 gallons per minute.

Coastal Plain Province – Floridan Aquifer System

The Floridan aquifer system is one of the most productive groundwater reservoirs in the United States. This system supplies about 50 percent of the groundwater used in the state. It is a major water source throughout the Coastal Plain region of Georgia. The Floridan aquifer system consists primarily of limestone, dolostone, and calcareous sand. It is generally confined, but is semi-confined to unconfined near its northern limit. Wells in this aquifer are generally high yielding (typically 1,000 to 5,000 gallons per minute) and are extensively used for irrigation, municipal supplies, industry, and private domestic supply.

The Floridan aquifer underlies most of the Coastal Plain portion of the Ocmulgee River basin. In the outcrop area between Twiggs and Wilcox Counties, rocks comprising the Floridan aquifer are mostly weathered to a clayey sand residuum that ranges from approximately 25 feet to 125 feet thick. The residuum is derived from the chemical weathering of the parent rock. The total thickness of the Floridan aquifer in the Ocmulgee basin ranges from a few tens of feet at its northern extent to more than 400 feet in the subsurface in extreme southern portions of the basin. Clastic grains of sand and shale are major components of the residuum of rocks comprising the Floridan aquifer near its northernmost extent. Throughout most of the southern part of the Ocmulgee basin, the Floridan aquifer consists of the Eocene Ocala Limestone and the Oligocene Suwannee Limestone.

2.1.6 Biological Resources

The Ocmulgee River basin supports a diverse and rich mix of terrestrial and aquatic habitats and is home to several federally and state-protected species. Some of the biological resources of the basin are summarized below.

Terrestrial Habitats

The Ocmulgee River is one of Georgia's few remaining free flowing streams, and contains excellent habitat for numerous freshwater fish species. The river traverses portions of two physiographic regions on its journey to the ocean. The headwaters begin in the Piedmont Region, but the majority of the Ocmulgee River basin lies in the Outer Coastal Plain Mixed Forest Province. The Outer Coastal Plain is a temperate rainforest (or temperate evergreen forest or laurel forest) ecoregion characterized by lower species diversity, but a greater abundance of individuals than equatorial or tropical rainforests. The Ocmulgee River is a typical blackwater coastal stream, which is a result of tannins from decaying tree roots and other organic materials passing through the sandy soil and staining the water. However, unlike other black water rivers, the Ocmulgee has a high pH (near 7.0) due to a large input of carbonate-rich water from Magnolia Springs.

Common species of trees include evergreen oaks and species of the laurel and magnolia families. Typically these habitats include a well-developed lower stratum of vegetation consisting of tree ferns, small palms, shrubs, and herbaceous plants. At the higher elevations, the trunks and branches of trees are often covered in moss. At the lower elevations, trees such as Evangeline oaks, baldcypress and others are covered by the epiphyte commonly known as Spanish moss.

The lower reaches of the Ocmulgee River basin flow through the extensive coastal marshes and interior swamps of Georgia's coastal region and are dominated by gum and cypress. The upland areas are covered by subclimax pine forests, which have an understory of grasses and sedges referred to as savannas. Undrained shallow depressions in savannas form upland bogs or pocosins, in which evergreen shrubs predominate.

Fauna

Terrestrial Fauna

The habitat diversity in this region supports a wide variety of wildlife. Although small numbers of black bears may be found in isolated areas, the white-tailed deer is the only large indigenous mammal in this region. Populations of feral hogs have become quite prevalent and their destructive foraging habits have made them a nuisance species in agricultural locales. Small mammals that are common to the basin include raccoons, opossums, flying squirrels, rabbits and numerous species of ground-dwelling rodents.

The bobwhite quail, eastern wild turkey and mourning dove are the primary game birds. Migratory non-game bird species, as well as waterfowl are numerous in this region. The red-cockaded woodpecker, which inhabits mature longleaf pine stands, is a federally-listed endangered species.

Fish Fauna

The diverse fish fauna of the Ocmulgee River basin includes 105 species representing 21 different families (Evans 1991; P. Lanford, Georgia Department of Natural Resources, personal communication). The carp and minnow family, Cyprinidae, is the largest family in the basin with 27 species. Minnows are generally small fish and are very important to the aquatic food chain as food for larger fishes, reptiles, and birds. Carp grow larger and anglers occasionally seek them for food. The sunfish family, Centrarchidae, is the second largest family with 22 species. Many of its members and those in the catfish family, Ictaluridae, are highly prized by anglers. The Ocmulgee River basin contains 10 species of catfish. The sucker family, Catostomidae, contributes eight species to the overall fish fauna. Even though suckers are not highly sought by anglers, they are ecologically important because they often account for the largest fish biomass in Georgia streams. In the lower Ocmulgee River, suckers made up 42 percent of the total biomass in mainstream and 34 percent in slough samples (Coomer and Holder, 1980). According to the state list of protected fish species, the Ocmulgee River basin is home to one endangered species (Altamaha shiner, *Cyprinella xaenura*) and two rare species (goldstripe darter, *Etheostoma parvipinne*, and redeye chub, *Notropis harperi*).

Fishery

The Ocmulgee River offers excellent fishing for redbreast sunfish, bluegill, redear sunfish, largemouth bass, black crappie, and channel and flathead catfish. For example, the world record largemouth bass was caught in 1932 from Montgomery Lake, an oxbow lake on the Ocmulgee River in Telfair County. Anglers occasionally catch striped bass in the river. Stripers are usually associated with springs, which they use as cool water refuges. Therefore, protection of these springs is critical to the survival of striped bass in the summer months.

The largest tributary to the Ocmulgee River is the Little Ocmulgee River. It is home to many species of freshwater fish and offers good fishing for redbreast sunfish, bluegill, largemouth bass, catfish species, and chain and redfin pickerel.

The Fisheries Section of the Georgia Department of Natural Resources (DNR) operates several facilities within the river basin. Bowens Mill Fish Hatchery, located in Ben Hill and Wilcox counties, produces bluegill, redear sunfish, largemouth bass, channel catfish, and white x striped bass hybrids. Dodge County Public Fishing Area (PFA) contains an intensively managed 104-acre lake. This lake provides excellent fishing for largemouth bass, bluegill, redear sunfish, black crappie, and channel catfish. DNR is currently building another 106-acre public fishing lake (Ocmulgee PFA) in Bleckley and Pulaski counties.

Several other notable lakes and reservoirs are located within the Ocmulgee River basin and are listed in an upstream to downstream direction. Black Shoals Reservoir is a 650-acre reservoir constructed to meet the water supply needs of Rockdale County. Lake Varner is an 850-acre water supply reservoir in Newton County. Both lakes provide good fishing for largemouth bass, bream, crappie, and channel catfish.

Lake Jackson is a 4,750-acre impoundment located in Jasper, Butts, and Newton counties and is owned and operated by the Georgia Power Company. The Alcovy, South, and Yellow Rivers and Tussahaw Creek form Lake Jackson. With its 135 miles of shoreline, Lake Jackson is known as one of the better bream fishing lakes in middle Georgia. The lake also offers excellent fishing for black crappie, largemouth bass, spotted bass, white and channel catfish, and bullheads.

High Falls State Park Lake is a 650-acre lake operated by the Parks, Recreation, and Historic Sites Division of GA DNR. This lake produces good catches of crappie, bream, largemouth bass, catfish, white x striped bass hybrids, and white bass.

Lake Juliette, also known as Rum Creek, is a 3,600-acre Georgia Power Company reservoir impounded to provide cooling water for Plant Scherer's electric generating facility. This infertile reservoir with clear water, extensive aquatic plant beds, and areas of standing timber offers good fishing for redear sunfish, largemouth bass, and striped bass.

Lake Tobesofkee is a 1,750-acre reservoir near Macon operated by Bibb County. Lake Tobesofkee provides good fishing for white x striped bass hybrids, largemouth bass, channel catfish, and black crappie. The lake is also very popular with pleasure boaters, especially during the summer.

At least 15 species of exotic fish (Table 2-2), those not native to the river system, live within the Ocmulgee River basin (P. Lanford, Georgia Department of Natural Resources, personal communication). Many of these species are well established and are detrimental to native fish populations.

Table 2-2. Exotic fish species present in the Ocmulgee River Basin

Common name	Scientific name
Threadfin shad	*Dorosoma petenense*
Goldfish	*Carassius auratus*
Grass carp	*Ctenopharyngodon idella*
Blacktail shiner	*Cyprinella venusta*
Common carp	*Cyprinus carpio*
Flathead catfish	*Pylodictis olivaris*
White bass	*Morone chrysops*
Morone hybrids	*Morone sp.*
Green sunfish	*Lepomis cyanellus*
Longear sunfish	*Lepomis megalotis*
Lepomis hybrids	*Lepomis sp.*
Shoal bass	*Micropterus cataractae*
Spotted bass	*Micropterus punctulatus*
White crappie	*Pomoxis annularis*
Yellow perch	*Perca flavescens*

2.2 Population and Land Use

2.2.I Population

As of 1995, about 605,200 people lived in the Ocmulgee watershed (DRI/McGraw-Hill, 1996). Population distribution in the basin at the time of the 1990 census is shown by census blocks in Figure 2-7. The major population centers in the Ocmulgee watershed include the development surrounding the eastern portions of metropolitan Atlanta in the upper portion of the basin and around Macon in the central portion of the basin.

Between 1975 and 1995, the population in the Ocmulgee River basin increased by 1 percent per year (DRI/McGraw-Hill, 1996). Basin population is projected to increase at an average growth rate through 2050.

2.2.2 Land Cover and Use

Land use/land cover classification was determined for the Ocmulgee River basin based on high-altitude aerial photography for 1972-1976 from the U.S. Geological Survey. Subsequently in 1991 land cover data were developed based on interpretation of Landsat TM satellite image data obtained during 1988-90, leaf-off conditions. These two coverages differ significantly. Aerial photography allows identification of both land cover and land uses. Satellite imagery, however, detects primarily land cover, and not land use, such that a forest and a wooded subdivision may, for instance, appear similar. Satellite interpretation also tends to be less accurate than aerial photography.

The 1988-90 land cover interpretation showed 62.8 percent of the basin in forest cover, 9.9 percent in wetlands, 3.3 percent in urban land cover, and 23.3 percent in agriculture (Figures 2-8 through 2-10). Statistics for 15 landcover classes in the Georgia portion of the Ocmulgee River basin for the 1988-90 coverage are presented in Table 2-3 (GA DNR, 1996).

Table 2-3. Land Cover Statistics for the Ocmulgee Basin

Class Name	Percent	Acres
Open Water	1.0%	37,855
Clear Cut/Young Pine	9.0%	349,144
Pasture	10.2%	396,593
Cultivated/Exposed Earth	13.0%	503,605
Low Density Urban	2.5%	98,098
High Density Urban	0.8%	31,120
Emergent Wetland	0.2%	6,728
Scrub/Shrub Wetland	1.4%	54,100
Forested Wetland	8.2%	320,459
Coniferous Forest	17.8%	692,414
Mixed Forest	20.6%	798,619
Hardwood Forest	15.4%	596,916
Salt Marsh	0.0%	0
Brackish Marsh	0.0%	0
Tidal Flats/Beaches	0.0%	0
Total	100.0%	3,885,650

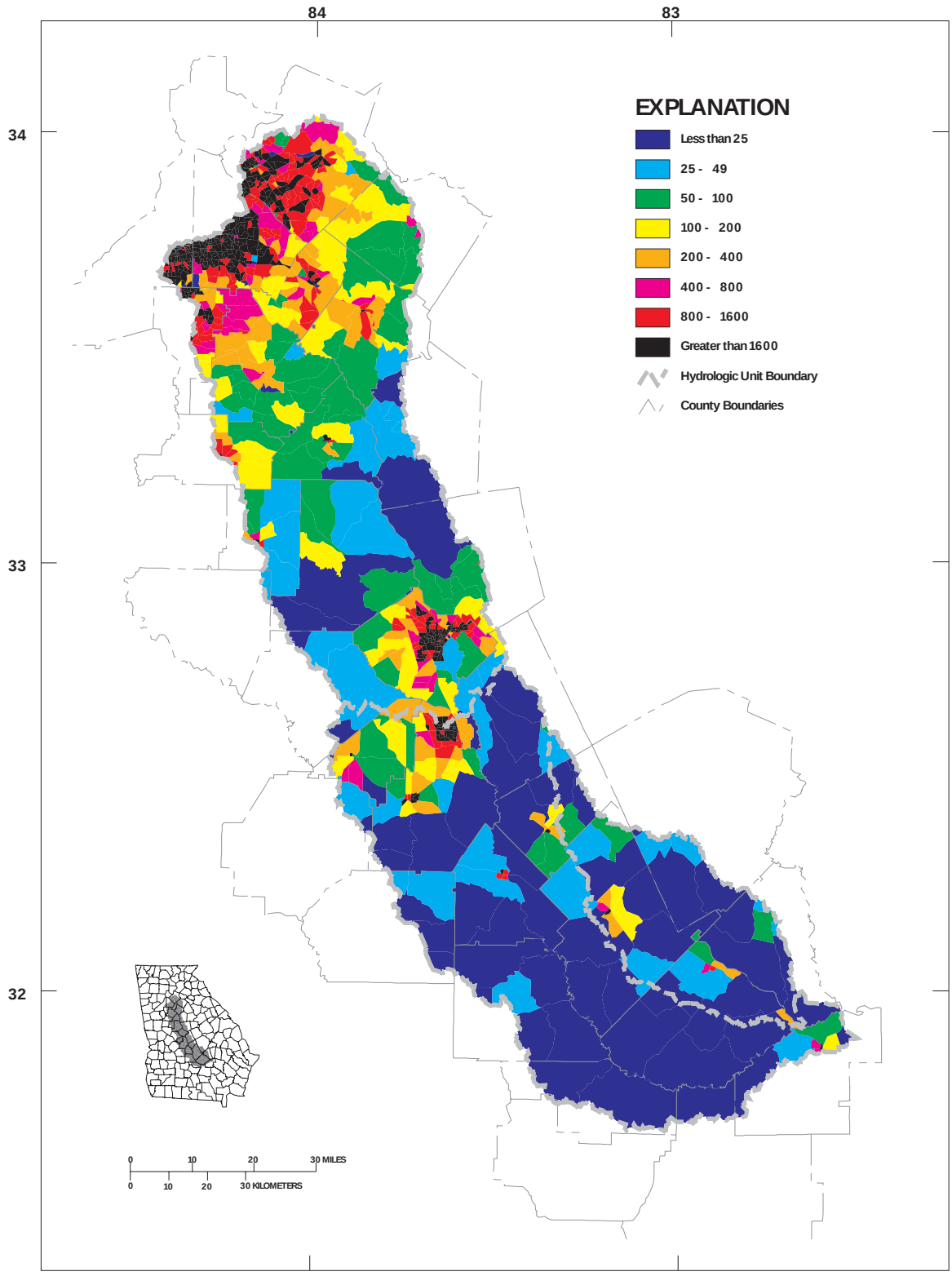

Figure 2-7. Population Density in the Ocmulgee River Basin (persons per square mile)

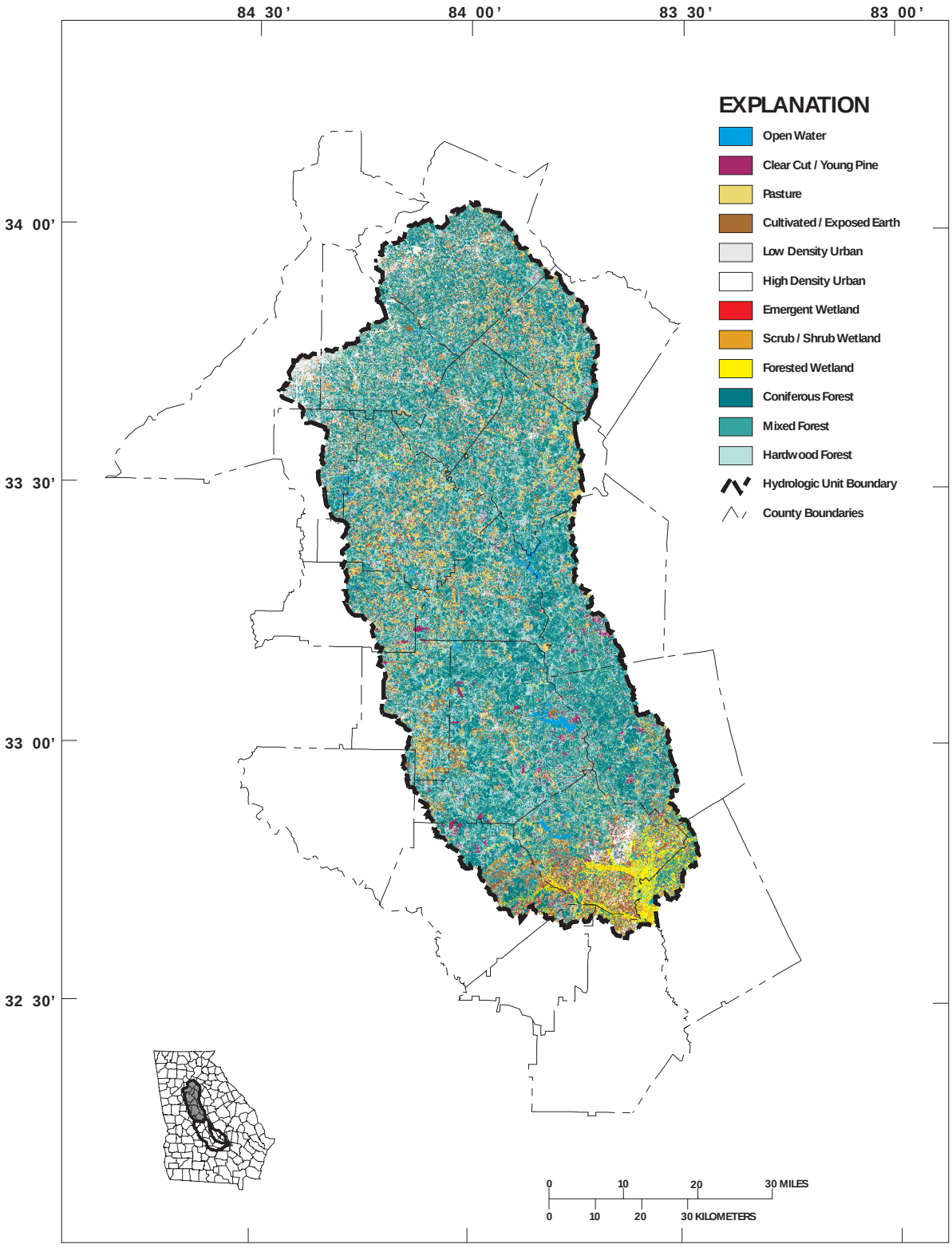

Figure 2-8. Land Cover 1990, Ocmulgee River Basin, HUC 03070103

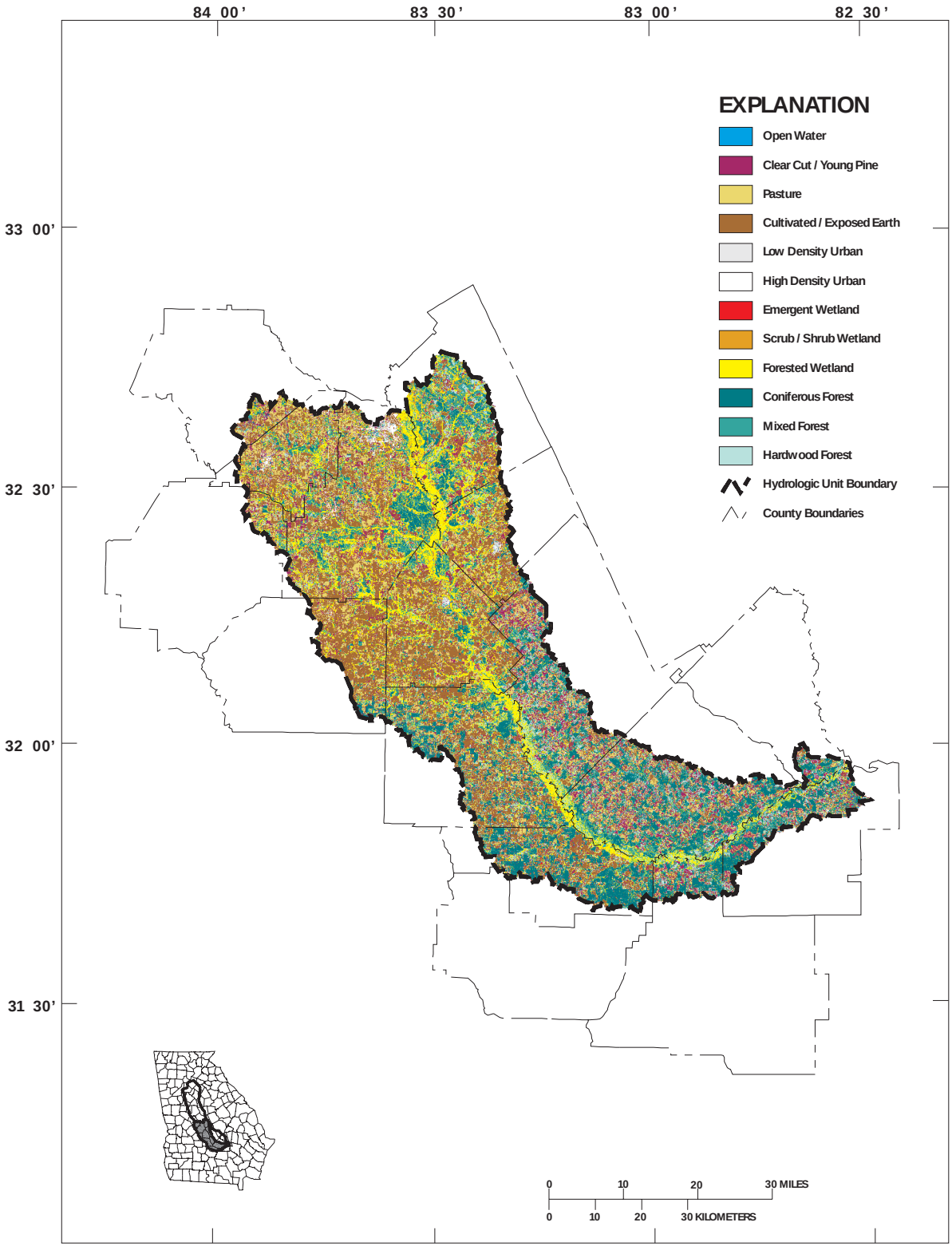

Figure 2-9. Land Cover 1990, Ocmulgee River Basin, HUC 03070104

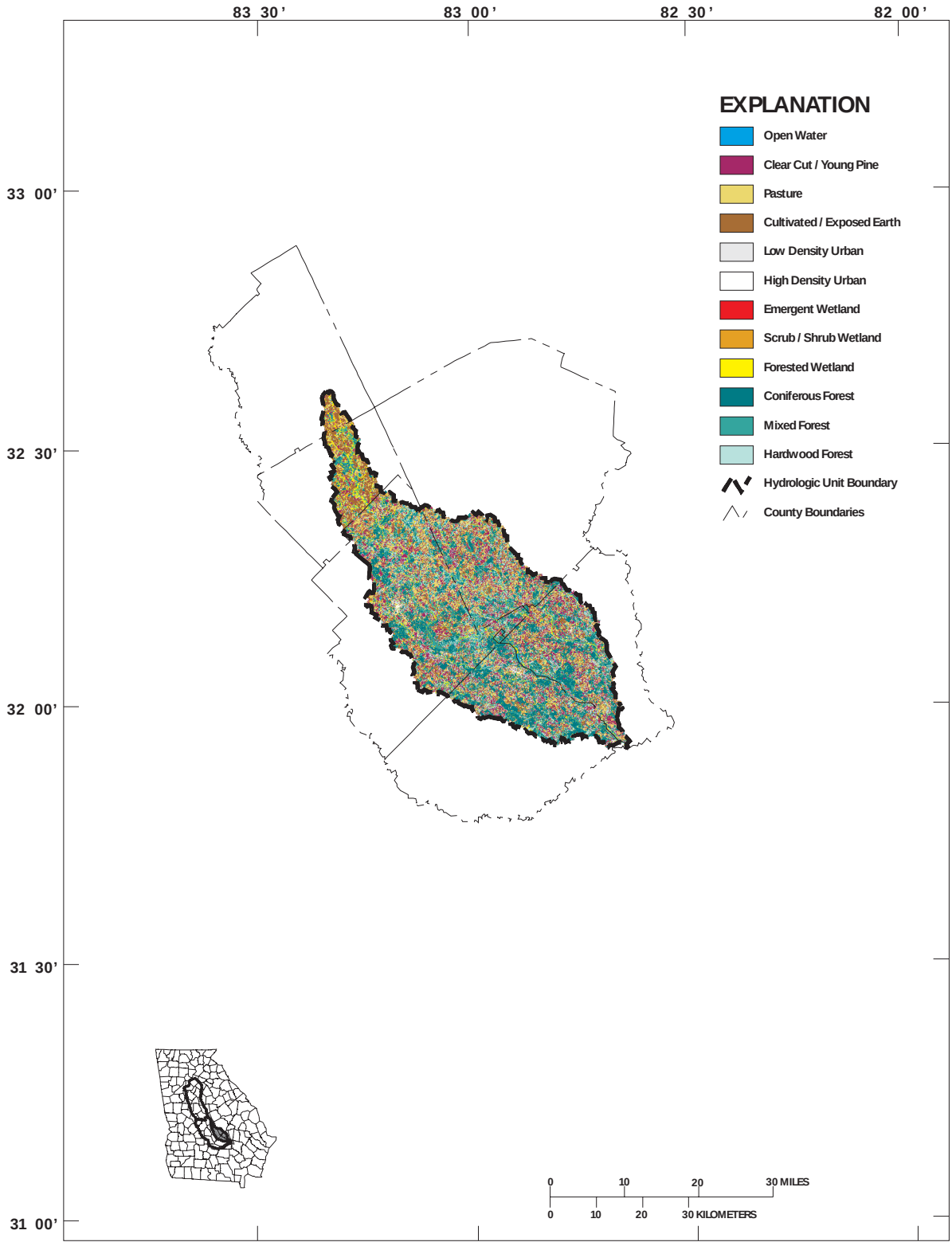

Figure 2-10. Land Cover 1990, Ocmulgee River Basin, HUC 03070105

Forestry

Forestry is a major part of the economy within the basin. Markets for forest products afford landowners excellent investment opportunities to manage and sell their timber, pine straw, naval stores, and other products. Statewide, the forest industry output for 2002 grew to approximately $30.5 billion dollars. The value added by this production, which includes wages, profits, interest, rent, depreciation and taxes paid into the economy reached a record high $19.5 billion dollars. Georgians are benefited directly by 177,000 job opportunities created by the manufacture of paper, lumber, furniture and various other wood products as well as benefiting the consumers of these products. Other benefits of the forest include hunting, fishing, aesthetics, wildlife watching, hiking, camping, and other recreational opportunities as well as providing important environmental benefits such as clean air and water and wildlife habitat.

According to the US Forest Service's Forest Statistics for Georgia 1997 report (Thompson, 1997), there are approximately 4,188,700 acres of commercial forest land contained in the entire counties that are within the basin representing approximately 60.45 percent of the total land area. Private landowners account for 82 percent of the commercial forest ownership while the forest industry companies account for 14 percent. Governmental entities account for about 4 percent of the forestland. Figure 2-11 depicts silvicultural land use in the Ocmulgee basin. Forestry acreage in the Ocmulgee River basin is summarized in Table 2-4.

There were approximately 75,300 acres classified as non-stocked in the 1997 survey but still remained in forestland.

For the period from 1982 to 1997, for the entire counties within the basin, the area classified as commercial forestland decreased approximately 13,896 acres or 0.3 percent. The area classified as pine type decreased approximately 148,466 acres or 7 percent. The area classified as oak-pine type increased approximately 23,871 acres or 4.5 percent. The area classified as upland hardwood decreased approximately 17,349 acres or 1.8 percent, and the area classified as bottomland hardwood increased approximately 52,348 acres or 8.5 percent.

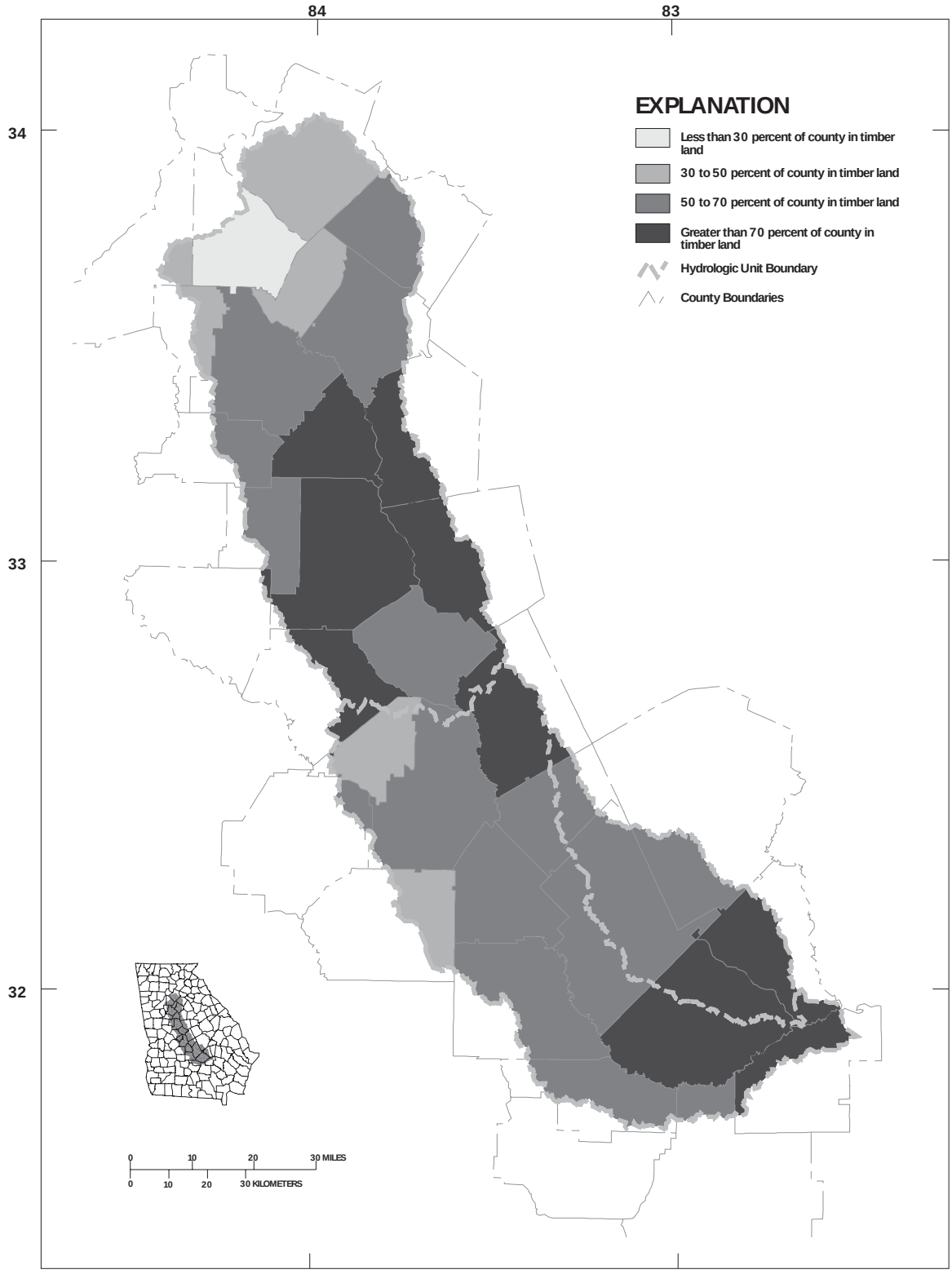

Figure 2-II. Silvicultural Land in the Ocmulgee River Basin

Table 2-4. Commercial Forest and Forest Type Acreage of Entire Counties in the Ocmulgee River Basin

County	Commercial Forest	Pine	Oak-pine	Upland Hardwood	Lowland Hardwood
Ben Hill	109,500	67,200	16,800	2,300	15,200
Bibb	87,100	44,600	11,000	16,200	15,200
Bleckley	78,600	38,200	5,100	15,400	20,000
Butts	83,300	39,500	9,000	34,500	200
Clayton	28,100	8,900	4,600	4,500	6,400
Coffee	240,900	137,900	30,400	8,800	53,000
Crawford	163,200	82,900	37,500	32,300	10,400
DeKalb	37,300	20,800	500	13,800	2,200
Dodge	204,700	103,100	22,800	28,200	46,300
Dooly	110,500	38,500	15,200	11,800	36,400
Fulton	123,800	51,900	9,800	52,700	8,600
Gwinnett	104,400	26,500	23,300	51,400	3,300
Henry	109,700	46,100	19,200	38,700	5,800
Houston	122,900	50,600	14,100	27,400	30,800
Jasper	190,700	97,100	15,500	69,800	7,600
Jeff Davis	151,600	101,100	20,400	4,900	20,300
Jones	210,700	135,300	37,600	25,500	10,100
Lamar	72,100	29,600	15,000	12,400	15,000
Laurens	312,200	153,400	20,000	62,500	74,300
Macon	154,800	57,900	14,300	46,300	36,300
Monroe	194,300	91,500	28,800	61,900	11,700
Newton	98,700	44,900	16,600	27,200	10,000
Peach	40,900	20,400	8,300	5,300	5,500
Pulaski	79,800	19,700	9,700	23,400	25,000
Rockdale	39,000	12,800	0	26,200	0
Spalding	66,900	17,800	21,500	18,600	6,800
Telfair	210,700	107,200	20,700	31,400	48,000
Twiggs	188,500	63,400	31,300	50,900	38,700
Upson	153,800	55,900	18,500	62,700	12,100
Walton	114,700	23,700	27,300	44,400	15,300
Wheeler	153,600	91,600	13,000	11,600	37,400
Wilcox	151,700	87,400	11,300	5,600	40,000
Total	*4,188,700*	*1,967,400*	*549,100*	*928,600*	*667,900*

Agriculture

Agriculture in the Ocmulgee River basin is a varied mixture of animal operations and relatively intensive commodity production. Agriculture land comprises some 19 percent of the land use within the basin.

Total farmland in the basin, approximately 728,831 acres (Figure 2-12), has declined steadily since 1982. Almost 45 percent of this farmland is in pasture. The remaining 55 percent is dedicated to growing cotton, peanuts, tobacco, and small grain (wheat, sorghum, soybean, millet). Commodity producers applied 98.54 million gallons per day to over 158,908 irrigated acres during 1998. Wilcox, Dodge, Irwin, and Pulaski Counties contain the larger irrigated acreage in the basin. Irrigation application, along with the number of acres actually harvested among these crops, varies from year to year in response to market conditions, government subsidy and conservation programs, and weather.

Livestock and poultry production is relatively intense in the upper portions of the Ocmulgee River basin and is comparable with that of other river basins in the Piedmont MLRA. Approximately 109,960 head of cattle, 5,035 head of swine, and 9,238,041 broilers and layers are raised on animal operations in the basin (Table 2-5).

Table 2-5. Agricultural Operations in the Ocmulgee River Basin (data supplied by NRCS)

Element	HUC 03070103	HUC 03070104	HUC 03070105	Ocmulgee Basin Total
Number of Farms (1997)	2,063	1,605	650	4,318
Dairy Cattle (Head 2000)	3,723	3,249	88	7,060
Beef Cattle (Head 2000)	56,403	32,816	13,681	102,900
Hogs and Pigs (Head 2000)	2,221	1,859	955	5,035
Boilers (1997)	4,312,466	4,538,015	0	8,850,481
Layers (1997)	283,035	104,402	123	387,560
Irrigated Acres (1998)	6,432	125,181	27,295	158,908
Irrigated Water Use (MGD 1995)	6.11	75.21	17.21	98.54
Harvested Cropland (Acres 1997)	62,908	281,923	54,176	399,007
Total Farm Land (1997)	242,225	385,750	100,855	728,831

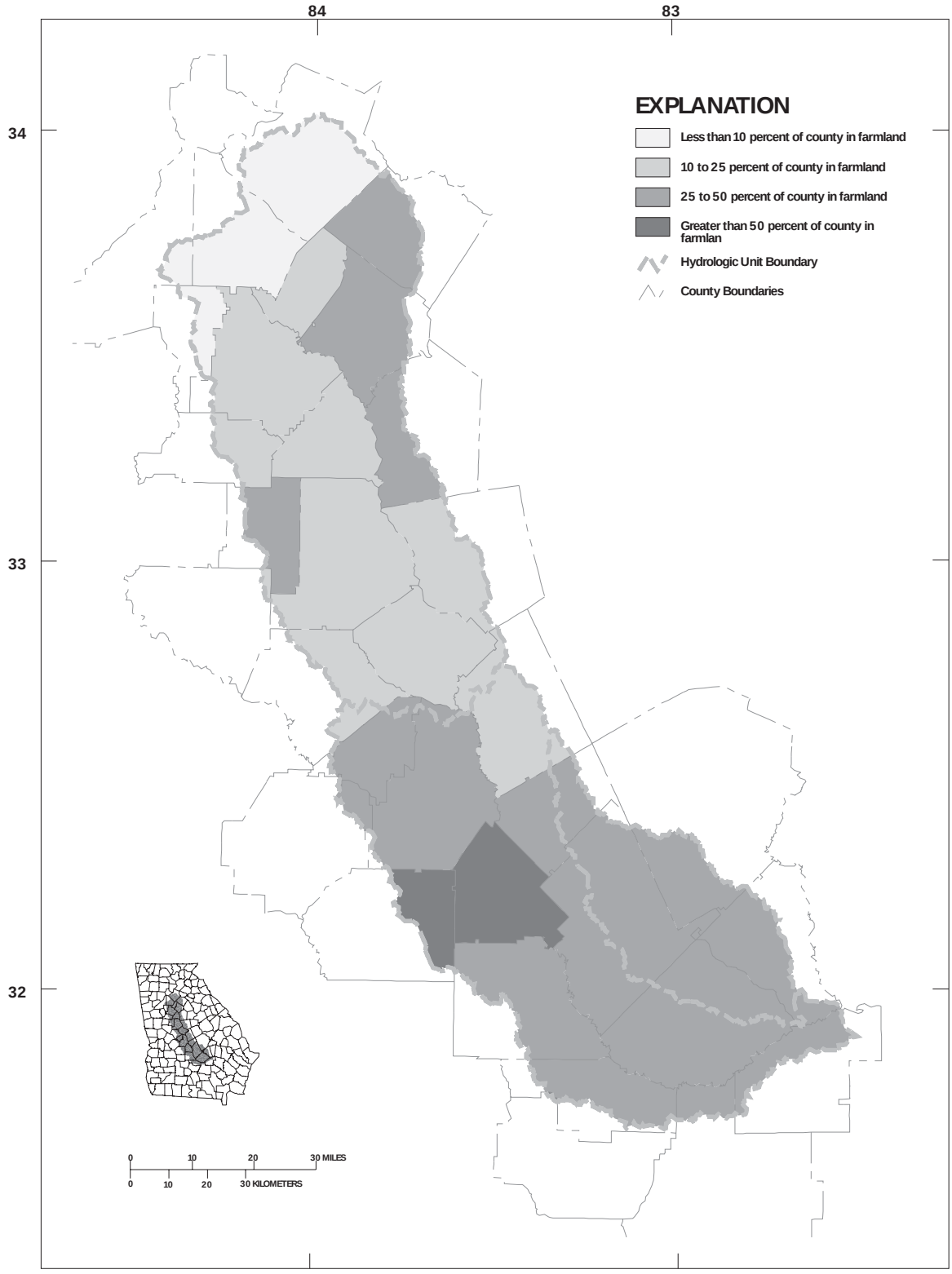

Figure 2-12. Agricultural Land in the Ocmulgee River Basin

2.3 Local Governments and Planning Authorities

Many aspects of basin management and water quality protection depend on decisions regarding zoning, land use, and land management practices. These are particularly important for the control of nonpoint pollution – pollution that arises in stormwater runoff from agriculture, urban or residential development, and other land uses. The authority and responsibility for planning and control of these factors lies with local governments, making local governments and jurisdictions important partners in basin management.

The Department of Community Affairs (DCA) is the state's principal department with responsibilities for implementing the coordinated planning process established by the Georgia Planning Act. Its responsibilities include promulgation of minimum standards for preparation and implementation of plans by local governments, review of local and regional plans, certification of qualified local governments, development of a state plan, and provision of technical assistance to local governments. Activities under the Planning Act are coordinated with the Environmental Protection Division (EPD), Regional Development Centers (RDCs), and local governments.

2.3.1 Counties and Municipalities

Local governments in Georgia consist of counties and incorporated municipalities. As entities with constitutional responsibility for land management, local governments have a significant role in the management and protection of water quality. The role of local governments includes enacting and enforcing zoning, stormwater and development ordinances; undertaking water supply and wastewater treatment planning; and participating in programs to protect wellheads and significant groundwater recharge areas. Many local governments are also responsible for operation of water supply and wastewater treatment facilities.

The Ocmulgee River basin includes part or all of 30 Georgia counties (Table 2-6 and Figure 2-2); however, only six are entirely within the basin, and two counties have less than 20 percent of their land area within the basin. Thus there are a total of 28 counties with significant jurisdictional in the basin. Municipalities or cities are communities officially incorporated by the General Assembly. Georgia has more than 530 municipalities. Table 2-7 lists the municipalities in the Ocmulgee River basin.

Table 2-6. Georgia Counties in the Ocmulgee River Basin

Counties Entirely Within the Ocmulgee River Basin	Counties Partially Within the Ocmulgee River Basin		Counties With Less Than 20% Area Within the Basin
Bibb	Ben Hill	Jones	Coffee
Butts	Bleckley	Lamar	Macon
Dodge	Clayton	Laurens	
Pulaski	Crawford	Monroe	
Rockdale	DeKalb	Newton	
Telfair	Dooly	Peach	
	Gwinnett	Spalding	
	Henry	Twiggs	
	Houston	Walton	
	Jasper	Wheeler	
	Jeff Davis	Wilcox	

Table 2-7. Georgia Municipalities in the Ocmulgee River Basin

HUC 03070103 – Upper Ocmulgee River Subbasin				
Adgaterville	East Juliette	Huber	Mansfield	Skipperton
Almon	Elberta	Indian Springs	McDonough	Smarr
Arkwright	Ellenwood	Jackson	Milstead	Snapping Shoals
Avondale	Experiment	Jenkinsburg	Musella	Snellville
Barnesville	Flippen	Jersey	Norcross	Social Circle
Belmont	Flovilla	Jonesboro	Oak Hill	Sofkee
Between	Forest Park	Juliette	Orchard Hill	Stark
Blacksville	Forsyth	Kelleytown	Orrs	Starrsville
Bolingbroke	Frnaklinton	Lawrenceville	Oxford	Stewart
Byron	Glen Haven	Lilburn	Panthersville	Stockbridge
Clinton	Gloster	Lithonia	Pepperton	Stone Mountain
Conley	Goggins	Lizella	Pittman	Trickem
Constitution	Gray	Locust Grove	Popes Ferry	Walden
Conyers	Grayson	Loganville	Porterdale	Walnut Grove
Covington	Hampton	Luella	Rex	Wesleyan
Culloden	High Falls	Luxomni	Round Oak	Whitehorse
Dames Ferry	Highland Mills	Macon	Sandy	Worthville
Dry Branch	Hillsboro	Magnet	Scottdale	Youth
HUC 03070104 – Lower Ocmulgee River Subbasin				
Abbeville	Centerville	Gresston	Jacksonville	Powersville
Adams Park	Clinchville	Grovania	Kathleen	Queensland
Bonaire	Cochran	Hartford	Milan	Rhine
Bowens Mill	Elko	Hawkinsville	Owensboro	Unadilla
Browndale	Finleyson	Hayneville	Perry	Warner Robins
Bullard	Fort Valley	Henderson	Pineview	
HUC 03070105 – Little Ocmulgee River Subbasin				
Alamo	Chauncey	Empire	Jay Bird Springs	Scotland
Cadwell	Chester	Godsinsville	McRae	Towns
Cary	Eastman	Helena	Planfield	Yonkers

2.3.2 Regional Development Centers

Regional Development Centers (RDCs) are agencies of local governments with memberships consisting of all the cities and counties within each RDC's territorial area. There are currently 17 RDCs in Georgia. RDCs facilitate coordinated and comprehensive planning at local and regional levels, assist their member governments with conformity to minimum standards and procedures, and can have a key role in promoting and supporting management of urban runoff, including watershed management initiatives. RDCs also serve as liaisons with state and federal agencies for local governments in each region and are working with the EPD to coordinate development of TMDL implementation plans.

Funding sources include members' dues and funds available through DCA. Table 2-8 summarizes the RDCs and the associated counties within the Ocmulgee River basin.

Table 2-8. Regional Development Centers in the Ocmulgee River Basin

Regional Development Center	Member Counties with Land Area in the Ocmulgee Basin
Atlanta Regional Commission	Clayton, DeKalb, Gwinnett, Henry, Rockdale
Heart of Georgia-Altamaha	Bleckley, Dodge, Jeff Davis, Telfair, Wheeler, Wilcox
McIntosh Trail	Butts, Lamar, Spalding
Middle Georgia	Bibb, Crawford, Houston, Jones, Monroe, Peach, Pulaski, Twiggs
Northeast Georgia	Jasper, Newton, Walton
South Georgia	Ben Hill
Southeast Georgia	Coffee

2.4 Water Use Classifications

2.4.1 Georgia's Water Use Classification System

The Board of Natural Resources was authorized through the Rules and Regulations for Water Quality Control promulgated under the Georgia Water Quality Control Act of 1964, as amended, to establish water use classifications and water quality standards for the surface waters of the State.

The Georgia Water Quality Control Board first established the water use classifications and standards in 1966. Georgia was the second state in the nation to have its water use classifications and standards for intrastate waters approved by the federal government in 1967. For each water use classification, water quality standards or criteria were developed which established a framework to be used by the Water Quality Control Board and later the Environmental Protection Division in making water use regulatory decisions.

The water use classification system was applied to interstate waters in 1972 by the EPD. Georgia was again one of the first states to receive federal approval of a statewide system of water use classifications and standards. Table 2-9 provides a summary of water use classifications and criteria for each use.

Congress made changes in the Clean Water Act (CWA) in 1987 that required each state to adopt numeric limits for toxic substances for the protection of aquatic life and human health. To comply with these requirements, the Board of Natural Resources adopted 31 numeric standards for protection of aquatic life and 90 numeric standards for the protection of human health. Appendix B provides a summary of toxic substance standards that apply to all waters in Georgia. Water quality standards are discussed in more detail in Section 5.2.1.

Table 2-9. Georgia Water Use Classifications and Instream Water Quality Standards for Each Use

	Bacteria (fecal coliform)		Dissolved Oxygen (other than trout streams)[2]		pH	Temperature (other than trout streams)[2]	
Use Classification[1]	30-Day Geometric Mean[3] (#/100 mL)	Maximum (#/100 mL)	Daily Average (mg/L)	Minimum (mg/L)	Std. Units	Maximum Rise (°F)	Maximum (°F)
Drinking Water Requiring Treatment	1,000 (Nov-Apr) 200 (May-Oct)	4,000 (Nov-Apr)	5.0	4.0	6.0-8.5	5	90
Recreation	200 (Freshwater) 100 (Coastal)	--	5.0	4.0	6.0-8.5	5	90
Fishing Coastal Fishing[4]	1,000 (Nov-Apr) 200 (May-Oct)	4,000 (Nov-Apr)	5.0	4.0	6.0-8.5	5	90
Wild River	No alteration of natural water quality						
Scenic River	No alteration of natural water quality						

1. Improvements in water quality since the water use classifications and standards were originally adopted in 1972 provided the opportunity for Georgia to upgrade all stream classifications and eliminate separate use designations for "Agriculture," "Industrial," "Navigation," and "Urban Stream" in 1993.
2. Standards for Trout Streams for dissolved oxygen are an average of 6.0 mg/L and a minimum of 5.0 mg/L. No temperature alteration is allowed in Primary Trout Streams, and a temperature change of 2 deg. F is allowed in Secondary Trout Streams.
3. Geometric means should be "based on at least four samples collected from a given sampling site over a 30-day period at intervals not less than 24 hours." The geometric mean of a series of N terms is the Nth root of their product. Example: the geometric mean of 2 and 18 is the square root of 36.
4. Standards are the same as fishing with the exception of dissolved oxygen, which is site specific.

In the latter 1960s through the mid-1970s there were numerous water quality problems in Georgia. Many stream segments were classified for the uses of navigation, industrial, or urban stream. Major improvements in wastewater treatment over the years have allowed the stream segments to be raised to the uses of fishing or coastal fishing which include more stringent water quality standards. The final two segments in Georgia were upgraded as a part of the triennial review of standards completed in 1989. All of Georgia's waters are currently classified as either fishing, recreation, drinking water, wild river, scenic river, or coastal fishing.

2.4.2 Water Use Classifications for the Ocmulgee River Basin

Waters in the Ocmulgee River basin are classified as fishing, recreation, or drinking water. Most of the waters are classified as fishing. Those waters explicitly classified in Georgia regulations are shown in Table 2-10; all waters not explicitly classified are classified as fishing.

Table 2-I0. Ocmulgee River Basin Waters Classified in Georgia Regulations[1]

Water Body	Segment Description	Use Classification
Alcovy River	Georgia Hwy. 81 to City of Covington Water Intake	Drinking Water
Big Haynes Creek	Georgia Hwy. 20 to Bald Rock Road	Drinking Water
Big Haynes Creek	Georgia Hwy. 78 to Confluence with Yellow River	Drinking Water
Jackson Lake	From South River at Georgia Hwy. 36; from Yellow River at Georgia Hwy. 36; from Alcovy River at Newton Factory Road Bridge to Lloyd Shoals Dam	Recreation
Ocmulgee River	Georgia Hwy. 18 to Macon Water Intake	Drinking Water
Tobesofkee Creek	Lake Tobesofkee	Recreation
Towaliga River	Headwaters to Georgia Hwy. 36	Drinking Water
Towaliga River	Georgia Hwy. 36 to High Falls Dam	Recreation
Yellow River	Georgia Hwy. 124 to Poterdale Water Intake	Drinking Water

[1] Rules and Regulations for Water Quality Control, Chapter 391-3-6(13). Waters within the Ogeechee River basin not explicitly classified and listed above are classified as Fishing.

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